Marine Science: Whales and Estuary Systems
Field portion onboard Schooner *Lady Maryland*

Course Description: Students will study the physiology and ecology of whales and the Chesapeake Bay. The knowledge gained during their stay on land will compliment their travels to the Stellwagen Bank estuary and whale identification and observation while at sea. Students will be responsible for hands-on fieldwork, laboratory experiments, lab reports and research projects.

Required Texts:
Stellwagen Bank, Nathalie Ward
Life in the Chesapeake Bay, second ed., Alice J. Lippson and Robert L. Lippson

➢ *Please note that the field portion of the Whales and Estuary Systems course is held aboard the Schooner Lady Maryland. Activities are largely dependent on weather and ability to secure docking and shore side programming. The first 9 days of the field portion will be Baltimore to Salem, MA .The other 3 trips will happen between the areas of Salem, MA and New York City. For the 2004 summer we are going to make an effort to coordinate Lady Maryland's schedule with activities associated with the 2004 American Sail Training Association's Tall Ships Challenge.*

Baltimore to Salem, MA:

Day	Possible Programming & Destination***
Day 1 Monday	Delaware canal – orientation to boat, watches, and boat life
Day 2 Tuesday	Off Jersey coast, watches and onboard programming
Day 3 Wednesday	Little Neck/Oyster Bay – watches and o-board programming
Day 4 Thursday	Little Neck/Oyster Bay – watches and o-board programming
Day 5 Friday	Prudence Island – beach exploration
Day 6 Saturday	New Bedford, possibly tour New Bedford whaling museum
Day 7 Sunda	Underway to Gloucester via Stellwagen Bank, MA, on board programming & watches
Day 8 Monday	Underway to Gloucester, MA, on board programming & watches
Day 9 Tuesday	Morning - Commercial Whale Watch; underway to Salem, MA., clean boat and equipment for next group, camp in Salem, MA
Day 10 Friday	Return to Baltimore by van

Salem, MA to New York City, NY:

Day	Possible Programming
Day 1 Monday	Under way to Gloucester, evening - Commercial Whale Watch,
Day 2 Tuesday	Underway to Woods Hole, via Stellwagen Bank – onboard programming & watches
Day 3 Wednesday	Possibly tour Woods Hole Aquarium
Day 4 Thursday	Underway to Bristol, RI
Day 5 Friday	Possibly program with "Save the Bay" – maybe eel grass snorkeling; underway to Block Island, NH, onboard programming and watches
Day 6 Saturday	Underway to Mystic, CT, onboard programming & watches
Day 7 Sunday	Tour Mystic Seaport
Day 8 Monday	Under way to New York City, onboard programming and watches
Day 9 Tuesday	Dock in New York City, Students will help clean the boat equipment for next group
Day 10 Wednesday	Return to Baltimore by van

*** On board programming is dependent on weather, conditions on the water and the length of the transit. The students will live and work in traditional maritime "watch" groups. Being on "watch" means navigating, tending sails, steering the ship, being on lookout and performing boat checks. When the students are not "on watch" they will be in educational classes. Because of the uncertainty involved in sailing a Schooner off shore the above syllabus may be drastically different than what the students actually do on board.

Land portion on campus

Day	Time	What: Skill and Learning Goals	How: Activities and Readings
Day 1 Thursday	Morning	Introduction to the land-based portion of the course & staff	Students introduce themselves and share the reasons for choosing this program. Staff will conduct an ice breaker activity We review the syllabus and go over rules and expectations.

Day	Time	What: Skill and Learning Goals	How: Activities and Readings
			The teacher will lecture about the topics mentioned.
		Introduction to cetaceans, evolution and taxonomy.	The students will use play dough to follow the evolution of the modern cetaceans.
	Afternoon	Fish dissection	Students will work in pairs to dissect a white perch.
		Whale and fish comparative anatomy	Students will complete worksheets and a game in order to understand the similarities and differences between whales and fish.
		Cooking	Students will prepare and eat fish (not mandatory).
		Study hall	Students will finish activities and assignments not completed previously in the day or prepare for tomorrow's lessons.
Day 2 Friday	Morning	Marine mammal stranding	The teacher will lecture on the subject of stranding.
		Inky video and discussion	Students will watch the *Inky* video and take notes to prepare for the MARP visit.
		Visit to the National Aquarium in Baltimore's Marine Animal Rescue Program	Students will receive a behind the scenes tour of the MARP facilities as well as the dolphin facilities. They will be able to see the currently rehabilitated animals and learn the process by which a stranded marine animal is reintroduced into the wild.
	Afternoon	Introduction to estuaries	The teacher will lecture on the topic of estuaries and how they relate to whales
			Students will participate in a salt wedge experiment in order to fully understand what an estuary is.

Day	Time	What: Skill and Learning Goals	How: Activities and Readings
		Whale migration projects	Students will work in pairs to research a particular whale. They will study satellite tagging in order to plot the travels of their whale and analyze their data; students will also answer critical thinking questions.
		Study hall	Students will continue to work on their whale migration projects.
Day 3 Monday	Morning	Whale behavior demonstration	Students will learn about behavior and adaptations while spending time in the pool. They will conduct experiments involving breathing, diving and behavioral traits.
	Afternoon	Whale physiology and diving adaptations	Students will learn and understand more deeply about specific adaptations and why they are important.
		Whale identification study	Students will observe pictures of humpback whales and attempt to identify their assigned whale through fluke identification only.
		IWC research	Students will work in pairs to research their assigned role for the International Whaling Commission mock meeting.
		Study Hall	Students will continue their research for the IWC mock meeting or finish their whale migration projects.
Day 4 Tuesday	Morning	Water quality testing	Students will test various parameters of the water in Baltimore's harbor and assess the quality of the water.
		National Geographic video	This video is specific to the great whales and is an excellent resource. Students will take notes on the video to help provide them with more ideas for their IWC research.
		Whale migration project	Students will present their research

Day	Time	What: Skill and Learning Goals	How: Activities and Readings
		presentations	and analysis to the rest of the class.
	Afternoon	National Aquarium in Baltimore	Students will tour the aquarium for the remainder of the day. They will be given a quiz based on the information in the aquarium.
Day 5 Wednesday	Morning	DNA/Genetics discussion	Students will understand what DNA is and its function. They will learn about DNA fingerprinting, how it relates to cetacean identification, and take part in a gel electrophoresis laboratory experiment.
		Onion DNA extraction	Students will extract the DNA from an onion.
		Gel electrophoresis Lab	Students will learn proper lab technique. They will work in pairs to prepare gels, load DNA and run the gels.
	Afternoon	Analyze gels	Students will make observations and determine their unknown.
		IWC mock meeting	Students will present their research in an organized meeting and determine rules and regulations for whaling.
Day 6 Thursday	Morning	Canoeing at Gunpowder State Park, Days Cove	Students will learn proper canoeing skills in order to safely explore the aquatic ecosystem at Days Cove.
	Afternoon	Submerged aquatic vegetation identification	Students will become familiar with native and non-native species of SAV's.
		Seining the Byrd River	Students will learn proper seine net techniques in order to catch and identify organisms.
		Water quality testing and comparing of two different bodies of water	Students will assess the health of two aquatic ecosysterms.
Day 7 Friday		Course evaluation Closing ceremony	